

**REMARKS**

Claims 1-30 are pending in this application. By this Amendment, claim 30 is amended. Reconsideration in view of the above amendments and following remarks is respectfully requested.

Applicant gratefully acknowledges the Office Action's indication that claim 30 would be allowable if rewritten in independent form. Applicant submits that claim 30 has been rewritten in independent form; therefore, claim 30 is allowable.

Applicant also gratefully acknowledges the courtesies extended by Examiner O'Neill in an interview on September 4, 2007. As discussed in the interview, Applicant submits a textbook excerpt discussing tacticity as Attachment A, which is further discussed below. As further discussed in the interview, Applicant submits that Chen's sPS does not have cation exchange groups disclosed or suggested in Chen's disclosure and discussed again below. Allowance of all pending claims is hereby requested.

**1. 35 U.S.C. §102(b)**

The Office Action rejects claims 1-3, 5, 7, 22-23, and 26-29 under 35 U.S.C. §102(b) over *Chen et al* (U.S. Patent No. 6,410,142, hereinafter referred to as "*Chen*"). The rejection is respectfully traversed.

As discussed in the interview, and our previous Response of April 3, 2007, which is hereby incorporated herein, *Chen* fails to disclose or suggest the combination of features of claim 1 including at least the features of (1) a polymer having cation exchange groups and (2) a membrane.

*Chen* does not disclose or suggest a polymer having cation exchange groups, but rather sPS generally. In Attachment A, syndiotacticity is discussed on pages 84-87 as merely the conformation of stereochemistry of a polymer. As discussed in the specification of the present application and recited in, for example, claims 6, 8, 18, 20, and 30, exemplary embodiments of cation exchange groups include sulfonate groups, carboxyl groups, phosphoric acid groups, imide groups, sulfonimide groups, sulfonamide groups, and hydroxyl groups. *Chen* does not disclose or suggest polymer having any of these groups or cation exchange groups generally. Rather, *Chen* discloses polystyrene in the stereochemical formation of syndiotactic polystyrene (sPS), or alternatively atactic polystyrene (aPS) or poly(2,6-dimethyl-1,4-phenylenen oxide (PPO). See col. 2, lines 14-24 and col. 3, lines 20-25 of *Chen*. Therefore, Applicant submits that *Chen's* sPS is merely styrene that has been polymerized to have stereotacticity and does not inherently contain cation exchange groups (and *Chen* does not disclose or suggest otherwise).

Additionally, *Chen* does not disclose or suggest using nanocomposites in a membrane. Rather, *Chen* discloses sPS being used as a metallocene catalyst composition and sPS nanocomposite as a way to alleviate the sPS problem of a "relatively lower crystallization rate, thus causing molding difficulties." See *Chen* col. 1, lines 39-49.

For at least the reasons set forth above, Applicant submits that claims 1 and 26 are allowable. Claims 2, 3, 5, 7, 22, and 23 depend from claim 1, and claims 27 and 28 depend from claim 26 and are allowable for at least the same reasons. Withdrawal of the rejection is hereby requested.

**2. 35 U.S.C. §103(a)**

The Office Action rejects claim 4 under 35 U.S.C. §103(a) over *Chen* in view of *Blanton et al.* (U.S. Patent No. 6,555,610, hereinafter referred to as "*Blanton*"); claim 8 over *Chen* in view of *Grot et al.* (U.S. Patent No. 5,919,583, hereinafter referred to as "*Grot*"); claims 6, 9, 10, 14-15, 17-19, 21, and 24-25 over *Chen* in view of *Taft III et al.* (U.S. Patent No. 6,630,265, hereinafter referred to as "*Taft*"); claims 11-13 over *Chen* in view of *Taft*, and further in view of *Yen et al.* (U.S. Patent No. 5,795,496, hereinafter referred to as "*Yen*"); claim 16 over *Chen* in view of *Taft*, and further in view of *Blanton*; and claim 20 over *Chen* in view of *Taft*, and further in view of *Grot*. These rejections are respectfully traversed.

Applicant submits that the references listed above, alone or in combination, fail to cure the deficiencies of *Chen*.

Regarding the combination of *Chen* and *Grot*, Applicant respectfully submits that *Chen* does not disclose or suggest its nanocomposite in a membrane, as discussed above, or making its nanocomposite using any of the polymers disclosed in *Grot*. Additionally, *Grot* does not disclose or suggest the use of nanocomposites in its disclosure.

The Office Action states:

Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to combine the cation exchange groups with the nanocomposite of *Chen et al.*, because *Grot et al.* teach increasing the transport of protons across the membrane and for enhanced mechanical properties such as increased stiffness (column 3 lines 2 and 30-31).

See page 5 of the Office Action. However, as mentioned above, *Chen* does not disclose or suggest using its nanocomposite in membranes, and *Grot* does not

disclose or suggest using nanocomposites in its membranes. See *Chen* col. 2, lines 62-67 and *Grot* col. 5, lines 58-65.

Regarding *Chen* and *Taft*, Applicant submits that *Chen* does not disclose or suggest the use of its nanocomposite in membranes, let alone in a fuel cell. *Taft* does not disclose or suggest the use of nanocomposites, let alone nanocomposites with clay material intercalated with a polymer or oligomer. One of ordinary skill in the art would therefore not have a reasonable expectation that the intercalation disclosed in *Chen* would not effect the desired properties, such as conductivity or flexibility, of *Taft* as patented.

For at least the reasons set forth above, Applicant submits that all pending claims are in condition for allowance. Withdrawal of the rejection is respectfully requested.

### **3. Conclusion**

Applicant invites the Examiner to contact Applicant's representative at the telephone number listed below if any issues remain in this matter, or if a discussion regarding any portion of the application is desired by the Examiner.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicant respectfully petitions for an appropriate extension of time. The fees for such extension of time may be charged to our Deposit Account No. 02-4800.

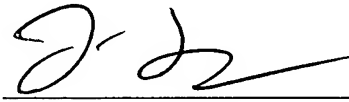
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Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: September 6, 2007

By: \_\_\_\_\_



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